

CLAIMS

1. A transmitting/receiving apparatus comprising:
a channel estimation section that performs channel estimation for a known symbol of a received signal;
5 a storage section that stores a channel estimation value estimated at said channel estimation section;
a channel correlation section that determines a correlation between a channel estimation value of a known symbol of a received signal received earlier and stored
10 in said storage section and the channel estimation value of the known symbol of the currently received signal;
a determination section that determines whether or not said correlation is a value enabling space division multiplexing communication with directivity control by
15 a communicating party;
a weight generating section that generates a transmitting weight from said channel estimation result:
a transmitting section that, when said determination section determines that space division multiplexing
20 communication with directivity control is possible, transmits the transmitting weight generated by said transmitting weight generating section to said communicating party, and, when said determination section determines that space division multiplexing
25 communication with directivity control is not possible, instructs said communicating party to perform space division multiplexing communication without directivity

control.

2. The transmitting/receiving apparatus according to claim 1, further comprising a receiving section that receives one of a signal indicating that space division
5 multiplexing communication with directivity control is performed and a signal indicating that space division multiplexing communication without directivity control is performed,

wherein, when said correlation is approximately 1,
10 and said receiving section receives a signal indicating that space division multiplexing communication with directivity control is performed, said transmitting section instructs to perform space division multiplexing communication with directivity control without
15 transmitting a transmitting weight, and transmits a signal indicating that there is no channel fluctuation, and when said correlation is approximately 1 and said receiving section receives a signal indicating that space division multiplexing communication without directivity
20 control is performed, instructs to perform space division multiplexing communication with directivity control and transmits a transmitting weight.

3. The transmitting/receiving apparatus according to
25 claim 1, wherein said weight generating section generates the transmitting weight when said determination section determines that space division multiplexing

communication with directivity control is possible, and does not generate the transmitting weight when said determination section determines that space division multiplexing communication with directivity control is
5 not possible.

4. A transmitting/receiving apparatus comprising:
a channel estimation section that performs channel estimation for a known symbol of a received signal;
10 a storage section that stores a channel estimation value estimated at said channel estimation section;
a channel correlation section that determines a correlation between a known symbol of a received signal received earlier and stored in said storage section and
15 a known symbol of a currently received signal;
a determination section that determines whether or not said correlation is a value enabling space division multiplexing communication with directivity control by a communicating party;
20 a weight generating section that generates a transmitting weight from the channel estimation result;
a multiplying section that multiplies a transmission signal by the transmitting weight generated at said weight generating section; and
25 a transmitting section that transmits the signal multiplied by the transmitting weight at said multiplying section:

a switching section that, when said determination section determines that space division multiplexing communication with directivity control is possible, outputs the transmitting weight generated by said weight
5 generating section to said multiplying section, and, when said determination section determines that space division multiplexing communication with directivity control is not possible, outputs "1" as said transmitting weight to said multiplying section.

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5. The transmitting/receiving apparatus according to claim 4, further comprising a timer section that measures a time said weight generating section takes to generate the transmitting weight ,

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wherein, when the time for generating said transmitting weight is equal to or greater than a predetermined time, said switching section outputs "1" as said transmitting weight to said multiplying section, and, when the time for generating transmitting weight
20 is less than a predetermined time, outputs the transmitting weight generated by said weight generating section to said multiplying section.

6. A transmitting/receiving apparatus comprising:

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a receiving section that receives one of a transmitting weight and a signal including an instruction to perform space division multiplexing communication

without directivity control;

a multiplying section that multiplies a transmission signal by said transmitting weight;

5 a transmitting section that transmits the transmission signal multiplied by the transmitting weight at said multiplying section;

a switching section that, when said receiving section receives said transmitting weight, outputs said received transmitting weight to said multiplying section, and, when said receiving section receives the signal including the instruction to perform space division multiplexing communication without directivity control, outputs "1" as said transmitting weight to said multiplying section.

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7. The transmitting/receiving apparatus according to claim 6, further comprising a storage section that stores a transmitting weight received earlier at said receiving section, wherein:

20 said receiving section receives a transmitting weight, a signal including an instruction to perform space division multiplexing communication without directivity control and a signal indicating that there is no channel fluctuation; and

25 when said receiving section receives a transmitting weight, said switching section outputs said received transmitting weight to said storage section and said

multiplying section, and, when said receiving section receives a signal indicating that there is no channel fluctuation, outputs the transmitting weight stored in said storage section to said multiplying section.

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8. The transmitting/receiving apparatus according to claim 6, further comprising a timer section that measures a receiving time for said transmitting weight,

wherein, when said receiving time is equal to or
10 greater than a predetermined time, said switching section outputs "1" as said transmitting weight to multiplying section, and, when said receiving time is less than a predetermined time, outputs said received transmitting weight to said multiplying section.

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9. A transmitting/receiving method comprising:

at a transmitting/receiving apparatus:

performing channel estimation for a received known
symbol;

20 determining a correlation between a channel estimation value of the known symbol received earlier and a channel estimation value of the known symbol currently received;

determining whether or not said correlation is a
25 value enabling space division multiplexing communication with directivity control by a communicating party;

generating a transmitting weight from said channel

estimation result;

transmitting said generated transmitting weight to
said communicating party when said determination is that
space division multiplexing communication with
5 directivity control is possible, and transmitting a
signal including an instruction to perform space division
multiplexing communication without directivity control
to said communicating party, when said determination is
that space division multiplexing communication with
10 directivity control is not possible; and

at said communicating party:

receiving one of the transmitting weight and a signal
including an instruction to perform space division
multiplexing communication without directivity control
15 transmitted from said transmitting/receiving apparatus;

multiplying a transmission signal by said received
transmitting weight when said transmitting weight is
received, and multiplying the transmission signal by "1"
as the transmitting weight when said signal including
20 an instruction to perform space division multiplexing
communication without directivity control is received;
and

transmitting the transmission signal multiplied
said transmitting weight to said transmitting/receiving
25 apparatus.

10. A transmitting/receiving method comprising:

performing channel estimation for a received known symbol;

determining a correlation between a known symbol received earlier and a known symbol currently received;

5 determining whether or not said correlation is a value enabling space division multiplexing communication with directivity control by a communicating party;

generating a transmitting weight from said channel estimation result;

10 multiplying the transmission signal by said generated transmitting weight, when said determination is that space division multiplexing communication with directivity control is possible, and multiplying the transmission signal by "1" as transmitting weight, when
15 said determination is that space division multiplexing communication with control directivity is not possible;
and

transmitting the transmission signal multiplied said transmitting weight.